

Chemistry I: Practice Test: Atomic structure

1: The three basic components of an atom are:

- A. protons, neutrons, and ions
- B. protons, neutrons, and electron
- C. protons, neutrinos, and ions
- D. protium, deuterium, and tritium

2: An element is determined by the number of:

- A. atoms
- B. electrons
- C. neutrons
- D. protons

3: The nucleus of an atom consists of:

- A. electrons
- B. neutrons
- C. protons and neutrons
- D. protons, neutrons, and electrons

4: A single proton has what charge?

- A. no charge
- B. positive charge
- C. negative charge
- D. Mastercard, Visa, or American Express

5: Which particles have approximately the same size and mass as each other?

- A. neutrons and electrons
- B. electrons and protons
- C. protons and neutrons
- D. No clue. They don't stay still long enough to get weighed.

6: Which two particles would be attracted to each other?

- A. electrons and neutrons
- B. electrons and protons
- C. protons and neutrons
- D. all particles are attracted to each other

7: The atomic number of an atom is:

- A. the number of electrons
- B. the number of neutrons
- C. the number of protons
- D. the number of protons plus the number of neutrons

8: The mass number of an atom is:

- A. the number of electrons
- B. the number of neutrons
- C. the number of protons
- D. the number of protons plus the number of neutrons

9: Changing the number of neutrons of an atom changes the atom into a different

- A. isotope
- B. element
- C. ion
- D. outlook on life

10: When you change the number of electrons on an atom, you produce a different:

- A. isotope
- B. ion
- C. element
- D. atomic mass

11: According to atomic theory, electrons are usually found:

- A. in the atomic nucleus
- B. outside the nucleus, yet very near it because they are attracted to the protons
- C. outside the nucleus and often far from it - most of an atom's volume is its electron cloud
- D. either in the nucleus or around it - electrons are readily found anywhere in an atom

12: To change Li to Li^+ , you need to:

- A. add one electron
- B. remove one proton
- C. remove one electron
- D. do Voodoo magic

13: Fe^{2+} and Fe^{3+} are different iron:

- A. ions
- B. isotopes
- C. elements
- D. atoms

14: ${}^{14}_6\text{C}$ and ${}^{12}_6\text{C}$ are examples of carbon:

- A. ions
- B. neutrons
- C. isotopes
- D. molecules

15: ${}^{13}_6\text{C}$ has how many protons?

- A. 6
- B. 12
- C. 13
- D. 14

16: What is the symbol for an ion which has 8 protons and 10 electrons?

- A. N^{3-}
- B. O^{2-}
- C. O^{3-}
- D. F^-

17: What is the nuclear symbol for the isotope of oxygen which has 9 neutrons?

- A. ${}^{16}_8\text{O}$
- B. ${}^{17}_8\text{O}$
- C. ${}^{18}_8\text{O}$
- D. ${}^{16}_9\text{O}$

18: Li^+ has how many electrons? (Hint: the atomic number of lithium is 3)

- A. 0
- B. 1
- C. 2
- D. 3

19. An element has an atomic number of 76. The number of protons and electrons in a neutral atom of the element are ____.
- a. 152 protons and 76 electrons
 - b. 76 protons and 0 electrons
 - c. 38 protons and 38 electrons
 - d. 76 protons and 76 electrons
20. What does the number 84 in the name krypton-84 represent?
- a. the atomic number
 - b. the mass number
 - c. the sum of the protons and electrons
 - d. twice the number of protons
21. All atoms of the same element have the same ____.
- a. number of neutrons
 - b. number of protons
 - c. mass numbers
 - d. Mass
22. According to the Law of Constant Proportions (Composition), a compound is always made of
- a. different elements and different ratios
 - b. same elements and same ratios
 - c. same elements with different ratios
 - d. different elements and same ratios
23. Isotopes of the same element have different ____.
- a. positions on the periodic table
 - b. chemical behavior
 - c. atomic numbers
 - d. mass numbers
24. According to the Law of Multiple Proportions,
- a. two elements can form different whole number ratios to make the same compound
 - b. two elements can form the same whole number ratios to make the same compound
 - c. two elements can form different whole number ratios to make different compounds
 - d. the dead Greek dudes had no clue!
25. The atomic mass of an element depends upon the ____.
- a. mass of each electron in that element
 - b. mass of each isotope of that element
 - c. relative abundance of protons in that element
 - d. average mass of all of the isotopes of that element
26. Which of the following is true about subatomic particles?
- a. Electrons are negatively charged and are the heaviest subatomic particle.
 - b. Protons are positively charged and the lightest subatomic particle.
 - c. Neutrons have no charge and are the lightest subatomic particle.
 - d. The mass of a neutron nearly equals the mass of a proton.
27. What is the relative mass of an electron?
- a. 1/1840 the mass of a proton
 - b. 1/1840 the mass of a neutron + proton
 - c. 1/1840 the mass of a C-12 atom
 - d. 1/1840 the mass of an alpha particle

28. All atoms are ____.
- positively charged, with the number of protons exceeding the number of electrons
 - negatively charged, with the number of electrons exceeding the number of protons
 - neutral, with the number of protons equaling the number of electrons
 - neutral, with the number of protons equaling the number of electrons, which is equal to the number of neutrons
29. The nucleus of an atom is ____.
- the central core and is composed of protons and neutrons
 - positively charged and has more protons than neutrons
 - negatively charged and has a high density
 - negatively charged and has a low density
30. The atomic number of an element is the total number of which particles in the nucleus?
- Neutrons
 - Protons
 - Electrons
 - protons and electrons

31. Complete the chart below

Element Name	Symbol	Abbrev. Isotopic symbol	Mass Number	Atomic Number	Number of Protons	Number of Neutrons	Number of Electrons	Charge
Iodine	I^{-1}		128	53				
	Fr^{+1}	Fr-224	224	87				
phosphorous			31				18	
		Rn-226	226				86	0

True & False:

32. _____ The electron cloud accounts for most of the mass of an atom.
33. _____ Bohr pictured the atom as having electrons in paths called *orbitals*.
34. _____ According to the Gold Foil experiment, atoms are mostly empty space.
35. _____ According to the Gold Foil experiment, atoms do not have a dense nucleus.

- 36._____ According to the Gold Foil experiment, the nucleus of atom has a negative charge.
- 37._____ According to the Gold Foil experiment, atoms are mostly empty space.
- 38._____ In the Gold Foil experiment, beta particles were fired at thin foil.
- 39._____ According to the Gold Foil experiment, most of the alpha particles went straight through.
- 40._____ According to the Gold Foil experiment, some alpha particles were deflected.
- 41._____ According to the Gold Foil experiment, a few alpha particles bounced straight back at the radioactive source.